CHAPTER I

MODELS BASED ON
FUNDAMENTAL ANALYSIS

The questions that loom large in the minds of investors are what stocks to buy / sell and when to buy / sell. The most widely used approach for stock selection is Fundamental Analysis. The focus of Fundamental Analysis is to find out the determinants of prices of securities that explain the past performance of a company and make projections about future on that basis. However, it is impossible for investors to analyse the past performance of and make projections for all the stocks that are traded on the stock exchanges.

In order to overcome this difficulty, a two-step strategy is adopted to select the stocks. In the first step, high return and/or low risk stocks are shortlisted based on historical data. This is followed by making estimations with regard to future profitability based on economic, industry and company specific factors which are then used as inputs in the models for computing intrinsic value of the stocks. The stocks with higher intrinsic value as compared to the prevalent market price are then selected for inclusion in portfolio. This initial exercise is based on the assumption that the stocks that have performed well in the past would continue to do so in future as well.

However, in the second stage, necessary assumptions regarding future estimates are made and incorporated in the model. Thus,
the outputs from these models are close to expected future values. Those models that enable investor to shortlist securities from the population are termed as "Selection Models" and the models that give an idea about when to buy or sell scrips are categorised under "Decision Models".

This chapter has three sections explaining the basis on which these models were developed. In the first and second sections, Selection and Decision models are covered and the last section includes other models that are commonly used by investors. The results of the models, with focus on practical application, have also been covered.
SECTION A

SELECTION MODELS

Factors that had consistently been proved to provide positive returns over the past period are the basis on which Selection models are developed. Review of the criteria used for stock selection would provide insight into the factors responsible for generating reasonably higher returns. Selection models are generally found to be useful in short listing eligible stocks for portfolio formation from a universe. As they are easy to understand and simple to adopt, individual investors can apply these models for forming the portfolios. Given below are some of the selection models that investors have regularly been using for investing in the stock market.

1. GRAHAM'S MODEL ON STOCK SELECTION

Selection standards of this model were suggested by Graham in various editions of his book 'Intelligent Investor', from the years 1949 to 1973 and compiled by Oppenheimer H. and Schlarbaum G (1981). This method of stock selection, though entirely based on historical data, has been found suitable for defensive investors.

This model is based on four factors viz., consistent dividend record, size, capitalisation and P/E ratio of the firms. The first criterion viz., consistent dividend record for a fairly long period of 15 - 25 years ensures that the company is a matured one with stable income. As a result, stocks with low P/E ratio and comparatively high dividend income will be selected. Other criteria ensure that the companies selected are large and are conservatively capitalised.
A portfolio constructed to test the performance of the criteria suggested by Graham indicated that if investors had followed these selection rules they would have earned positive abnormal returns (net of commissions) of approximately 0.2% per month (Oppenheimer H., 1984).

2. **Graham - Rea Model**

This simple portfolio selection model by Graham & Rea is based on financial ratios. The model considers five reward ratios and an equal number of 'risk' ratios. The firms that do not confirm to the given criteria will be excluded from the selection process. Reward criteria are set of ratios based on market prices of the shares and risk is the financial aspects explaining the volatility of earnings.
REWARD CRITERIA

a) Is the price-earnings ratio less than one-half the reciprocal of the triple-A bond yield?

b) Is the price-earnings ratio less than 40% of the highest 'average' price-earnings ratio of the last five years?

c) Is the dividend yield at least 2/3 the triple-A bonds yield?

d) Is the stock price below 2/3 of the tangible book value per share?

e) Is the stock price below 2/3 of the net current asset value per share?

RISK CRITERIA

a) Is the debt-to-equity ratio less than one?

b) Is the current ratio greater than two?

c) Is total debt less than twice the net current asset value?

d) Has the earnings-per-share growth rate of the last ten years averaged at least 7% per year?

e) Over the time period examined in question nine, have eight or more of the annual growth rates in earnings per share been equal to 5% or more?

This model is also based on historical data. A very conservative model that is suitable mainly for risk-averse investors. Triple A bond is considered risk free (no default risk) and carry a lower rate of return. The underlying idea of linking the stocks' yield to this rate is to ensure that the stocks are relatively underpriced, thus leaving scope for capital appreciation. The pay back period of stocks selected using this model would be low. Low debt-equity ratio ensures that interest rate fluctuations do not affect the
earnings of the firm. These criteria provide scope for selecting stocks with moderate but less volatile growth rates. Several mutual funds abroad such as Rea-Graham Fund, LMH Fund, Sequaria Fund and Pacific Partners Fund use the rules of the this model for stock selection.

However, it may not be possible to adopt the model as such in a developing country like India where interest and growth rates are high. Suitable modifications in the upper limit of the ratios may help in eliminating high priced securities from the selection purview.

3. **STOCK SELECTION BASED ON SORTING/GROUPING**

Selection of stocks based on some financial aspect like dividend yield or price to earnings ratio or return on networth or market capitalisation or price to bookvalue (P/B) ratio, is a commonly used method by investors. The methodology adopted for such selection is as follows: Regularly traded stocks are ranked on the basis of a desirable ratio and are categorised into groups (of quartiles, deciles etc.). Scrips in the most desirable group are selected for buying and in the least desirable group are for selling.

For example, dividend yield is reckoned based on current dividend rates and market prices. High dividend yield scrips are considered as value stocks while low yield ones as growth stocks. Thus, stocks are grouped into high and low yield scrips and portfolios are formed according to risk preferences of investors. Stock selection models based on earnings yield (i.e. P/E ratio) and P/B ratios are also widely used by individuals as well as investment practitioners.
Some of the studies based on single criterion model are quoted below:

a) **Stock Selection Based On Dividend Yield**

Knowles H.C. and Petty D.H. (1992)'s study considered dividend yield for stock selection. This study was an updation of an exercise carried out by Slatter J. (1988), which showed that the performance of value stocks (18.4%) was higher than that of market index, Dow Jones Industrials (10.9%) during the period between 1973 and 1988. The study by Knowles and Petty showed an average annual return of 17.8% by top 5 value stocks followed by 16.7% by top 10 group whereas Dow Index averaged a return of only 11.41% during the period up to 1990.

The authors also reported superior performance of value investing between 1954 and 1980 by quoting Widmann's study that ranked stocks on the basis of dividend yield year after year to make ten high yield and ten low yield stock portfolios and their performance was then compared with Dow30. Ten high yield stocks averaged an annual total return of 13% beating the low yield shares (7.8%) and Dow30 (10%)

b) **Stock Selection Based On P/E Ratio**

Widmann's another study was based on P/E grouping during the period 1973 to 1980 and recorded evidence for consistent out performance of high yield issues over low yield ones. Grouping done on this basis provides a relatively easy to use selection tool
but suffers from certain drawbacks. Portfolios selected on the basis of low P/E ratio criterion do not consider stocks like turnaround cases, cyclical stocks with expected rise in profits during peak period or with dwindling profit at troughs. Moreover, companies with negative earnings are excluded from the selection purview.

c) **Stock Selection Based On P/S Ratio**

A study by Sanchack Jr. A.J and Martin J.D. (1987) provided an alternative to the groupings based on P/E Ratio by considering Price-to-Sales (P/S) Ratio. The argument in favour of sales (in lieu of earnings) is mainly on account of less complication involved in making projections and even less accounting discretion involved. Other apparent advantage is the possibility of considering the entire universe of securities except those firms engaged in financial intermediation. Accounting linkage between these two ratios could be explained as:

\[
P/E \text{ Ratio} = \frac{Profit \text{ } to \text{ } Sales \text{ Ratio}}{Net \text{ Profit Margin}}
\]

This study compared the performance of portfolios constructed on the basis P/S Ratio of all 400 companies in the sample (set A), P/S Ratio (SET B) and P/E Ratio (SET C) of only non-negative earnings stocks during the period between 1976-84. Portfolio performance evaluation measures suggested by Sharpe, Jenson and Taylor were used for comparison. In addition, median returns were considered as distribution of returns was skewed. The results indicated that returns on portfolio selected on the basis of low P/S ratio from sets A & B had comparatively higher return and relatively lower risk.
than high P/S ratio based portfolio. Portfolios with low P/E stocks have been found to have relatively higher risk and lower return than portfolios made under set A and set B. However, performance evaluation using Jenson’s measure produced a different set of results. That is, in 8 out of 10 cases, low P/E Ratio stocks outperformed low P/S portfolios in sets A & B.

A study by Latane H.A., Joy O. M., and Jones C.P. (1970) considered grouping of stock by applying two-step sorting procedure. Stocks were initially sorted by earnings to price ratio (E/P) and 'high' and 'low' portfolios each with 60 stocks were selected; in the second stage, based on earnings change ratio (E/E), 25 securities under each of the portfolios were shortlisted. These ratios were recalculated using adjusted earnings (adjustment made for seasonality factor) portfolios were constructed. The performance of all these four portfolios was compared for finding out the better selection procedure and for consistency in performance.

4. STOCK SELECTION BASED ON RANKING

Investors for selection of scrips use ranking services provided by leading investment advisory firms and investment publications. The rankings given are based on historical data and estimations regarding future earnings, dividends etc., as well as the risks associated with the stocks. Methodology used for ranking stocks by a leading investment firm, Value Line, has been published in Value Line Record (1985) and is reproduced by Fuller R.J and Farrel J. L (1987)
a) **Value Line Safety Ranking**

The Safety Rank is computed by averaging two other Value Line Indices namely Price Stability Index and Financial Strength Index. The Price Stability Index is a ranking based on the standard deviation of weekly stock price changes over the most recent five years. 5% of stocks with the lowest standard deviation receive a ranking of 95 and 5% stocks in the highest grouping get a rank of 5. The primary variables used to determine Financial Strength Index are equity coverage of debt, equity coverage of intangibles, quick ratio, accounting methods, variability of return, fixed charge coverage, stock price stability and company size.

The Value Line Safety Ranks range from 1 to 5 with the top rank indicating the lowest risk and rank 5 the greatest risk. This ranking system takes into account the risk associated with realising capital gains from stocks. In addition to the traditional risk measures, based on financial ratios, it considers variation in stock prices, a risk measure used under Modern Portfolio Theory.

b) **Value Line Timeliness Ranking**

The Value Line Investment Survey publishes “timeliness” rank of 1700 publicly traded companies according to anticipated performance over the next 12 months.

<table>
<thead>
<tr>
<th>Rank</th>
<th>No of stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Highest</td>
<td>100</td>
</tr>
<tr>
<td>2. Above Average</td>
<td>300</td>
</tr>
<tr>
<td>3. Average</td>
<td>900</td>
</tr>
<tr>
<td>4. Below Average</td>
<td>300</td>
</tr>
<tr>
<td>5. Lowest</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>1700</td>
</tr>
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</table>
Stocks ranked as group 1 are expected to perform best while those ranked below are likely to provide the lower returns. The ranking is based on three components:

a) Relative valuation based on 'earnings momentum'.
b) An 'earnings surprise' factor and
c) A value index based in 'non parametric value position'.

The relative earnings momentum is determined by taking each company's year to year change in quarterly earnings and this percentage change is then divided by the average year to year quarterly change for all stocks. The stocks which rank in the top third of all companies are given a score of 1200 points, the middle third are given 800 points and those in the bottom third are given 400 points. The earnings surprise factor is based on the difference between actual reported quarterly earnings and value line's estimate of the quarterly earnings. The number of points assigned to each stock is:

<table>
<thead>
<tr>
<th>Difference Between Reported Earnings &amp; Estimated Earnings</th>
<th>Points Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 30% or more</td>
<td>- 400</td>
</tr>
<tr>
<td>- 15% to - 29%</td>
<td>- 200</td>
</tr>
<tr>
<td>- 14% to + 14%</td>
<td>0</td>
</tr>
<tr>
<td>+ 15% to 29%</td>
<td>+ 200</td>
</tr>
<tr>
<td>+ 30% or more</td>
<td>+ 400</td>
</tr>
</tbody>
</table>
Form A

Certified that the work incorporated in the Thesis

**Critical Evaluation of Portfolio Selection Rules**

submitted by Ms. S. Uma was carried out by the candidate under my supervision / guidance. Such material as has been obtained from other sources has been duly acknowledged in the thesis.

Date 17.01.2002

Pune

Dr. R.K. Parchure
Research Guide
(from April 16, 1965 through April 2, 1985). Over the total time period, group 1 stocks have been found to outperform stocks from all other groups and returns on group 2 stocks were higher than group 3 stocks and so on. This confirms that the performance were as per the rankings.

Another study on the usefulness of following Value Line Ranking was by Fuller and Wong (1988). This study examined the relation between return and three different measures of risk - one traditional measure based on financial ratios proxied through Value Line Safety Rank and two theoretical measures, namely, beta and standard deviation during a 12 year period between 1974 - 85. The study considered individual stocks as well as portfolios and the results indicated that the Safety Rank exhibited the highest correlation with return followed by standard deviation and beta in the third place.

The models discussed above provide investors a basis to select stocks, mainly on the strength of past performance, from a universe. Though, these models give an overall idea of “what” stocks to buy, they do not provide clues as to “when” the scrips are to be bought/ sold. Fair value estimation aids fundamental analysts to decide exactly on investment timing. In what follows, the models that help determining intrinsic value of scrips are enumerated.
SECTION B

DECISION MODELS

Decision models are based on the concept of 'Security Valuation' which is the centrepiece of fundamental analysis. Security valuation is the process applied to compute intrinsic value based on the predictions made about the future. After having selected stocks on the basis of the past performance (using models described in earlier chapter), techniques of valuation are applied to identify 'mispriced' securities at a time point. That is, intrinsic value so arrived at is compared with the market price; the stocks with high positive margin of safety are bought and the stocks with high negative safety margin are sold.

The development of stock valuation approach began in the aftermath of stock market crash in 1929 when the values of almost all investments got eroded and an attempt was made to find the suitable value for securities. The basis for security valuation was provided by Weiss R. (1930) who stated that "the proper price of any security, whether a stock or a bond, is the sum of all the future income payments discounted at the current rate of interest in order to arrive at present value". Later, Guild S. E. (1931) measured intrinsic value assuming different rates of average growth in earnings and required rates of return during the period of investment and different dividend yield and price-earnings ratio at the end of the holding period of a stock.
Williams J.B. (1938) 's Present Value Approach is the basis on which various stock valuations models were developed later. This approach is based on the premise that "the value to be paid for acquiring a stock should be equal to the present value of a stock or bond's discounted stream of benefit that it is expected to provide". As it is impossible to predict the cash flow from stocks year after year till perpetuity, some growth rate in cash flow is assumed to make the model tractable.

Divergent views are found in financial literature on the determination of intrinsic value of stock. The first issue is related to the very definition of the term 'cash flow from stock', i.e. what constitutes cash flow - dividend or earnings or modified earnings figure. Secondly, which is the appropriate growth rate of the benefits - established growth rate or anticipated growth. These issues have led to further modifications of the present value approach.

**Dividend Vs Earnings**

The argument in favour of dividend for security valuation is centred on the following:

a) The dividends are the only source of cash received by shareholders from the company.

b) If the rate of return on the profits ploughed back in the business is lower than the present rate, investors are not going to derive benefits out of money retained.

c) If the retained profits are deployed profitably, it becomes the source for future dividends.
Williams (1938) favoured dividend to earnings on the ground that "the earnings not paid out to shareholders are retained in the business in order to invest the same in profitable projects which in turn produce higher earnings and result in higher future dividends. Thus, the valuation method based on dividend avoids double counting and is preferred to earnings".

Earnings are considered mainly on the ground that the shareholders are the owners of the company and the portion of earnings which is not distributed as dividend but retained in the business belongs to them. Moreover, the amount to be distributed is based on the policy regarding pay-out adopted by the board and is highly subjective. Also, the evidence that the stock prices are highly correlated with change in earnings rather than dividend is given as justification for the consideration of earnings for valuation purposes.

Graham and Dodd (1988) argued "the two estimates of future earning power and future dividend paying capacity are indistinguishable...can not adequately estimate one without the other, since earnings are the source of dividends and dividend pay-out rate must be considered in predicting the growth of earnings, appraisal and prediction of dividend paying capacity of a corporation must be an integral part of a careful and through examination of a corporation's earning power".

If investment analysts were to use both the models based on dividends and earnings, they get two different intrinsic values; fair price arrived at by using earnings would be higher than the value based on dividends. This leads to inconsistency and confusion.
among users of the model. Thus, the term dividend is defined as a function of earnings and payout ratio to overcome this problem. In other words, dividend is equal to earnings minus retained profits. This calls for a policy on the part of the management regarding profit retention.

**How much profit is to be retained in the business?**

Blake (1990) has suggested a concept based on *permanent income*. Economic earnings or permanent income is defined as “the maximum amount of real income that can be consumed out of real wealth during the given period without impairing the ability of that stock of real wealth to deliver real income and hence real consumption in the future”. In other words, if the firm is to maintain dividend at a particular amount or rate by making some net additional investment income, it has to identify the source of that additional income. It can be sourced either by retaining a portion of earnings or by resorting to external funds. If the firm is constrained to raise funds from external sources, and additional investments are needed to maintain real income, then a portion of the earnings are to be retained in the business and the same should not be considered as shareholders’ income.

Therefore, economic earnings are equal to reported earnings plus new external funds less net investment. If earnings were defined to mean economic earnings, there would not be any difference in fair value arrived at by dividend discount model and earnings valuation model.

Buffett, as given by Hagstron (1994) has adopted a more or less similar definition of earnings for the purpose of stock valuation;
present values of Owners' Earnings instead of reported earnings are considered to arrive at the fair value of the share. A point that may be noted here is that valuation based on modified earnings needs thorough understanding of the working of the firm(s) under consideration.

As differences in earnings arise mainly due to discretion given to the management in deciding the method and rate of depreciation, quantum of amortisation of intangible items and other non-cash expenses, cash flow per share, instead of earnings per share, is considered in some valuation models. Cash flow is computed by adding depreciation, amount amortised during a year for intangible assets and any other non-cash expenditure debited to profit and loss account to reported profit after tax. Total number of shares outstanding then divides this total cash flow to get cash flow per share.

**Established Vs Anticipated growth Rate**

Other issue on which different opinions exist is the growth rate to be applied in reckoning the fair value of a share. The opinion favouring 'established rate' is on the grounds that the prediction of future is highly subjective and largely unpredictable. Valuations based on these subjective estimates are only speculative and not suitable for long term investment. Therefore, the focus of the initial research studies carried out in this area was on standardising the accounting earnings and estimating normalised earning per share. This was believed to be reflective of the true earning power of the firm at the midpoint in the business cycle and is the growth rate that is considered in the constant growth model. Evidence in support of this current, normalised earnings is given
"The analyst's philosophy must still compel him to base his
investment valuation on an assumed earning power no larger than
the company has already achieved in some year of normal
business. Investment values can be related only to demonstrated
performance". "Value based on a satisfactory trend must be wholly
arbitrary and hence speculative, and hence inevitably subject to
exaggeration and later collapse".

As opposed to this was the new-era theory that is based on
expected future growth. This theory states "the only reason why
two firms which have similar fundamental characteristics quote at
different prices is the expected growth rate in their earnings or
dividends." The stocks that are expected to grow at faster than
average rates for long period of time are assigned higher prices by
the market. Thus anticipated earnings from the basics of stock
valuation. Valuation approach based on future growth rate,
independent of past growth, needs comprehensive and elaborate
estimations on the part of investment analysis.

Thus, models based on dividends / earnings / cashflow with
assumption regarding the future growth rate are widely used for
valuation of stocks. These models are employed in either of the
following forms:

a) To find the intrinsic value or required rate of return of a stock

b) To compute financial ratios like price to earnings ratio or price
to book ratio.
The main advantage of expressing the value of a stock in the form of a ratio is that it helps comparison across companies or industries and makes the selection process easier.

This chapter is therefore divided into three sections, the first deals with decision models based on net present value computation, the second with the models based on financial ratios and the final section includes other decision models commonly used by investors.

I. MODELS BASED ON NET PRESENT VALUE

1. DIVIDEND DISCOUNT MODEL

Expected future dividends are discounted by assuming an interest rate which is equivalent to risk free rate plus the risk premium to compensate for the uncertainty associated with the dividend receipts. This can be expressed mathematically as,

\[ V = \frac{d_1}{(1+k)^1} + \frac{d_2}{(1+k)^2} + \ldots + \frac{d_i}{(1+k)^i} + \ldots \]

\[ = \sum_{i=1}^{\infty} \frac{d_i}{(1+k)^i} \]

where

- \(d_i = \) expected dividend flow from securities at time \(t\)
- \(k = \) discount rate.
This equation for intrinsic value computation can be used only when all future dividends receivable by holding a share is predictable.

However, forecasting dividend stream for an infinite period is an impossible task. This basic model was made tractable by assuming some growth rate of dividend payments. That is, given the current dividend payout, it is possible to compute intrinsic values if assumption regarding the rate at which the dividend would grow in the near future. For instance, zero growth model, as the name suggests, does not assume any growth and is more suitable for valuing irredeemable preference shares. Constant growth models are used for companies with established growth rates whereas multi-phase models accommodate both normalised as well as anticipated growth rates. Multi-phase models assume that relatively higher growth rate in the initial period(s) and a constant growth rate based on normalised earnings thereafter. The estimation of different growth rates is based on the product life cycle: -

a) Growth Stage - High growth in sales and profits, low pay-out ratio
b) Transition stage - slow sales growth and low profit margin; high pay-out ratio
c) Maturity stage - stable growth on sales and profit; stable pay-out ratio
d) Decline - Declining sales and profit as also dividend.

The valuation of the model is expressed in either of the following two forms:
a) Intrinsic Value (V) that can be compared to the current market price.

b) Internal Rate of Return (IRR), denoted as k* which equates the present value of projected dividends with the current market price (p) and is then compared with ‘normal expected return’.

Depending on the assumption made regarding the growth rate (g), DDMs can be categorised as follows:
<table>
<thead>
<tr>
<th>MODEL</th>
<th>ASSUMPTION</th>
<th>VALUE (V)</th>
<th>IRR (k*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Zero Growth Model</td>
<td>Dividends will remain unchanged.</td>
<td>$V = D_o / k$</td>
<td>$k^* = D_o / p$</td>
</tr>
<tr>
<td>ii) Constant Growth Model</td>
<td>Dividends will grow from period to period at the same rate forever.</td>
<td>$V = D_o \left[ \frac{1+g}{k-g} \right]$</td>
<td>$k^* = \frac{D_o \left(1 + g \right)}{p} + g$</td>
</tr>
<tr>
<td>iii) Multiple Growth Model a) Two Phase Model</td>
<td>Constant growth rate ($g_1$) till time $T$ when different growth rate is assumed to commence and continue perpetually.</td>
<td>$V = \sum_{t=1}^{T} \frac{D_t}{(1+k)^t} + \left[ \frac{D_T + 1}{(k-g)(1+k)^T} \right]$ (I phase)</td>
<td>$p = \sum_{t=1}^{T} \frac{D_t}{(1+k)^t} + \frac{D_{T+1}}{(k^* - g)(1+k^*)^T}$</td>
</tr>
<tr>
<td></td>
<td>Three different dividend growth rates: initial growth rate higher than normal rate; declining second phase leading to a constant growth rate in third phase.</td>
<td>$V = \sum_{t=1}^{T} \frac{D_t}{(1+k)^t} + \left[ \frac{D_T + 1}{(k-g)(1+k)^T} \right]$ (II phase)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$V = \frac{D_o}{r-g_n} \left[ (1+g_n) + H (g_n-g_w) \right]$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) H Model</td>
<td>Modified three-phase model based on an implicit growth rate ($g_n$), with third growth rate exactly half way between $g_a$ and $g_n$ at $H$ years.</td>
<td>$k^* = \frac{D_o}{P_o} \left[ (1 + g_n) + H (g_a-g_n) \right] + g_n$</td>
<td></td>
</tr>
</tbody>
</table>
iv) **Finite Growth Model**: An investor who holds the security for a definite time period would, in addition to receiving regular dividend payments, get the sale price at the end of the period. By relaxing the assumption regarding perpetuity in the DDM, intrinsic value in such case is determined by,

\[ V = \frac{D_1 + p_1}{(1+k)} \]

The assumption underlying the above mentioned growth models is that the dividend would grow, year after year, at a certain rate (of course, with an exception of zero growth model). However, this assumption regarding growth rates of dividend does not coincide with the actual dividend pattern. Companies typically maintain their dividend level fairly constant, increasing it only if there is a great deal of confidence that they can maintain the higher level and decreasing it only as a last resort. Thus, the dividend distribution pattern of the company, when graphed resembles a step function, with a flat payment stream interrupted periodically by discrete jumps.

v) **Markov Model**: With a view to capturing practical dividend payment pattern, Hurley and Johnson (1994) recommended a variation of the DDM. This realistic dividend discount model assumes that the discount rate is fixed and dividend payment is assumed to follow Markov process. That is, in each period, a firm will either increase its dividend with a positive probability \( p \) or keep the dividend rate unchanged with probability \( 1-p \). Increase in dividend is either geometric (i.e. by a constant percentage) or additive (i.e. by a fixed amount). Over years it results in a step pattern of dividend payments. It is also assumed that, each period,
there is a small positive probability that the firm will go bankrupt. Thus, there are three possibilities for each time period:

a) The dividend increases
b) The dividend is maintained
c) The firm goes bankrupt.

Where a firm temporarily reduces or suspends dividend payments, the value of the firm’s stock will lie between the estimated value and the lower bound on value (Lₐ).

Under Additive Model, the value of the firm Vₜ with probability p, 1-p-pₖ and pₖ would be,

\[ \frac{\{Dₜ + Δ + Vₜ₊₁(Dₜ + Δ) / (1 + k)\}}{Dₜ + Vₜ₊₁(Dₜ) / (1 + k)} = Vₜ \]

and the expected value Vₐ is,

\[ Vₐ = \frac{D₀}{k} = \left[ \frac{1}{k} + \frac{1}{k²} \right] Δp, \]

and the lower bound Lₐ is,

\[ Lₐ = \frac{D₀(1 - pₖ)}{k + pₖ} + \left[ \frac{1}{k + pₖ} + \frac{1}{(k + pₖ)²} \right] Δp, \]

Similarly, under Geometric Model, the expected value V₉ is,
the lower bound $L_G$ is,

$$L_G = D_0 \left[ \frac{1 + p_g - p_B}{k - (p_g - p_B)} \right]$$

The model was tested by taking the stocks of three telephone utilities as they normally have regular dividend payments and compared with the intrinsic values estimated using Gordon model. The discount rate was estimated at 11% which consists of market risk premium 5% and Treasury yield of 6%; growth rate was based on actual dividend history. The results showed the cases where dividend pattern is more erratic; valuation based on Gordon model is an upwardly biased estimate. The additive model was found to be preferable when firms have erratic dividend patterns, whereas geometric model was found to be useful for more stable income shares.

2. **Earnings Discount Model**

Under this model, expected earnings are discounted at appropriate rates for finding out the intrinsic value of securities. The model can be made tractable by assuming growth rate as discussed under the DDM. The formula for calculating intrinsic value is,

$$V = P_1 \left[ \frac{E_0 (1 + g_1)}{(1 + k)} \right] + P_2 \left[ \frac{E_1 (1 + g_2)}{(1 + k)^2} \right] + \ldots$$

Earnings are used for the fair value computing, when the analysts expect to make more accurate estimate of earnings rather than
dividends or when companies with 'nil' dividend records were considered for selection. This is also useful for estimating fair value of new issues not having sufficient record of dividend payments. Limitations of the model include non-consideration of companies with negative earnings and higher growth rate shown in earnings by means of window dressing and inclusion of non-recurring, extraordinary income.

3. CASH FLOW DISCOUNT MODEL

A study by Hawkins (1977) brought to the fore the declining usefulness of earnings in the inflationary, leverage, varying payout ratio scenario. This study pointed out that earnings per share were useful for prediction of future value only in case of short cycle, domestic – oriented, high margin and low capital to sales ratio companies. Companies with long business cycle, low profit margin, capital intensive and with considerable foreign currency components can not be valued by using earnings for their current earnings are more volatile and less indicative of future trends due to factors like inflation, exchange rate and replacement cost. Valuing stocks with the above characteristics using cash flow would provide better results. The article also exhibited that the firms whose capital expenditure and dividend coverage ratios are positive and improving coupled with declining debt-equity ratios are expected to increase dividends in future.

Bernstein L.A. (1983) established that cash flow analysis is useful for distinguishing between healthy and bankrupt concerns. ‘A financially healthy firm will generate cash from operations on a consistent basis, the unsuccessful firm will find its cash drained by slowdowns in receivable and inventory turnovers, by operating
losses or by a combination of these factors”. His study suggested a ‘complete’ approach to calculate cash flow from operations. This approach considers changes in working capital, dividends and capital expenditure beginning with sales rather than conventional profit after tax as has been shown below.

Cash flow from operations

A. Sales
+ Decrease (- increase) in accounts receivable
+ Cash collections on sales
+ Other revenues (+ or - adjustments for non-cash items)
= Total cash collections from operations

B. Cost of Goods Sold (excluding depreciation, amortisation etc.)
+ Increase (- decrease) in inventories
+ Decrease (- increase) in trade payable
+ Operating Expenses
+ Other Expenses (including interest)
+ Increase (- decrease) in prepaid assets
+ Decrease (- increase) in accrued liabilities
+ Income Tax Expense (excluding deferred taxes)
+ Decrease (- increase) in accrued taxes
= Total cash outflows from operations

Net Cash Flows from Operations = A – B

If the operational cash flow of a firm is continuously positive for a number of years, say 5 to 7 years and ‘discretionary cash flow’\(^1\) is also positive, these companies may be considered for selection, subject to the condition that their intrinsic values computed either

\(^1\) Discretionary cash flow is the ‘real’ cash flow adjusted for inflation with a view to maintain the value of asset base during the period of inflation.
on dividends or on earnings leaves sufficient margin of safety when compared to the current price.

II. VARIATIONS IN NET PRESENT VALUE MODEL

These are less rigorous models that provide a standard for comparing companies with different earnings level and are widely used by investors. Under these models, dividend and earnings are expressed as ratios by considering some other factor. Since these definitions recognise the importance of retained earnings, discrepancy in fair values does not arise.

1. EARNINGS CAPITALISATION MODEL (P/E RATIO)

Taking dividend as the function of earnings (E) and payout ratio (p), the numerator in the DDM is expressed as $E \times p$.

$$V = \sum_{t=1}^{\infty} \frac{E_t \times p_t}{(1+k)^t}$$

Like DDM/EDM, this model can be made tractable by assuming some growth rate in earnings. The 'fair price' of securities (V) is divided by earnings to arrive at 'normal P/E ratio'.

$$\frac{V}{E_0} = \frac{\frac{P_1(1+g_1)}{(1+k)^1} + \frac{P_2(1+g_1)(1+g_2)}{(1+k)^2} + \frac{P_3(1+g_1)(1+g_2)(1+g_3)}{(1+k)^3} + \ldots}{1 + \frac{E_0}{(1+k)^1} + \frac{E_0 E_1}{(1+k)^2} + \frac{E_0 E_1 E_2}{(1+k)^3} + \ldots}$$

P/E ratio of the firms in maturity stage with constant earnings growth rate would be,
Assuming that the future investment plans of companies are fully funded only through retained earnings without resorting to external borrowings or fresh issues and return on net worth (r) will be constant into perpetuity, the above mentioned formula can be rewritten as:

$$\frac{V}{E_0} = P \left[ \frac{1 + g_s}{k - g_s} \right]$$

where,

$$r (1 - p) = \text{growth rate in earnings / dividend per share.}$$

A firm having high growth rates in earnings and low retention ratio discounted at a low rate of return would be having a high P/E ratio. Generally, companies in the transition stage would fit in this category.

2. **NET WORTH CAPITALISATION MODEL (P/B RATIO)**

Further expanding the term 'earnings' as the function of Return on Equity (RoE) and Book Value (BV), enables analysts to bring out the relation between price and earnings as follows:

$$V = \frac{RoE \times BV \times p}{r - g}$$

Rearranging the terms,
\[ P/B = \frac{RoE \cdot p}{r - g} \]

Higher networth will have positive impact on P/B ratio whereas \( r \) and \( d \) would have negative impact. The effect of the pay out ratio will depend on the level of growth rate.

These models, though useful in giving an insight into the factors that contribute to the value of shares, they suffer from certain drawbacks.

a) Fair value is not ascertainable when the earnings of the firm turn negative or no dividend is declared.

b) Different accounting policies adopted by firms for the purpose of arriving at earnings pose a serious problem in making the estimations.

3. MODEL BASED ON SURPLUS ACCOUNTING

In order to overcome the drawbacks of P/E and P/B models and to make effective use of these ratios in stock valuation, Fairfield P.M. (1994) advocated the usage of clear surplus accounting. Clear surplus accounting is defined as the end of period book value is equal to beginning of period book value plus earnings minus dividends. Restating the DDM in terms of clear surplus accounting enables usage of accounting information in the valuation formula without the need to assume a fixed relation between accounting data and future dividends as well as payout policy.

The model assumes that P/E is a function of expected change in future profitability and P/B is a function of expected level of future
profitability. Abnormal earnings, i.e. earnings adjusted for normal (risk adjusted) rate of returns on book value is also required. In the model, future dividends are replaced with the clear surplus and abnormal earnings. Thus, price is restated in terms of current book value and future abnormal earnings,

\[ P_t = y_t + \frac{x^{t1}}{(1+k)(1+k)^2} + \ldots + \frac{x^T}{(1+k)^T} \]

where

\[ y_t = \text{Book value at time } t. \]
\[ x^{t1} = X_t - ky_{t-1}, \text{ in which } x_t = \text{earnings for period } t \text{ and } k = \text{risk adjusted rate of return.} \]

The main property of this model is convergence, i.e., whatever the firm's current earnings, competitive forces are assumed to reduce the firm's abnormal earnings over time and at some point, the firm will have only zero abnormal earnings. Thus, the necessity of estimating future dividend stream does not arise. Dividing the above equation by book value, \( y_t \), results into,

\[ \frac{P}{B} = 1 + \frac{Ax}{B_t} \]

where, \( AX \) is the discounted stream of future abnormal earnings.

If the firm is expected to have zero abnormal earnings in the future, its market value will equal its book value. Expressing price in the form of \( P/E \) ratio equals the capitalisation factor plus the capitalised present values of expected growth in abnormal earnings.
The model was tested to find out whether P/B ratios and P/E ratios correlate positively with future return on book value and growth in earnings. The data used was from 1970 to 1984, for the sample size of 22741; earnings were calculated for 5 years following the classification date. The firms were ranked by P/B as well as P/E ratios and were grouped into high, medium and low categories. The results confirmed that median P/B ratios correlate positively with current ROE and P/E ratio is correlated with growth in earnings, though there were significant difference in growth in future earnings across the three P/E groups. When both the P/E and P/B ratios were considered simultaneously for classification of the firms, the following results were obtained:

1. High P/B-High P/E firms
   Current profitability was representative of future profitability

2. High P/B-Low P/E firms
   Above average future profitability with higher current profitability.

3. Low P/B-High P/E firms
   Current profitability was not a good indicator of future profitability.

4. Low P/B-Low P/E firms
   Moderate earnings growth and current profitability was indicative of future profitability.

Stability of these ratios was also tested. Since ROE is more stable over time than the earnings growth rate, retention tested against P/B was relatively higher for the firms over the period than P/Es.
III. OTHER MODELS

Mathematical models discussed above breaks down when the firm under consideration,

a) undergoes super growth rate in earnings.
b) is cutting down the losses year after year and is likely to turn around; and
c) shows signs of bankruptcy with increasing quantum of operating losses year after year.

Under a) above, growth rate in dividends or earnings exceeds expected risk free rate / discount rate and it is not possible to compute fair value, thus, one would have to simply assume that the share is a good buy. In case of (b) and (c) above, calculation of growth rate on the basis of historical data would not be plausible. Moreover, they are useful only for individual stock selection. Following models are used in such cases for taking investment decision.

1. MULTI-FACTOR MODELS

Average relationship at one point in time between price and the return generating fundamental factors of cross section of companies has been found to be an excellent selection tool in cases
where computation of intrinsic value is not possible. Some research studies are given below:

a) One of the first studies using multiple regression to establish 'average' relationship was developed by Whitbeck & Kisor (1963). The study considered 135 stocks as of June 1962 and three independent variables viz., payout ratio (b) growth rate (g) of earnings per share and expected standard deviation of earnings per share changes around estimated growth rate (σ) as determinants of P/E's to find the following relation:

\[
P/E = 8.2 + 1.59 + 6.7b - 0.2σ
\]

It may be noted that the signs of equation are exactly in line with the theoretical values: higher growth in earnings and pay-out having positive relationship with P/E ratio and the proxy for risk having negative relationship. Under this model, stocks with P/E ratios less than estimated P/E ratio would be considered 'undervalued' and the shares with P/E ratios more than average P/E would be 'overvalued'.

b) Bower and Bower (1969) constructed a valuation model for stock selection and for examining risk. Basic hypothesis tested was that the differences among stocks in terms of P/E ratios depend on differences in expectations about growth in earnings, pay out ratio and on differences in risk class as captured by discount rate (r). The assumptions on which the model is based on are:

1) Discount rate on stock depends on -
   a) its marketability (MKT)
b) conformity of stock price movements with general market movement. (CON)

c) its price variability (VAR) & other characteristics like management resiliency, vulnerability to govt actions and firm effects. (FIR)

2) Expectations about the horizon of the non-normal growth period (n) and normal growth rate (g) vary from one period to the next but are same for all stocks in a given period.

3) Relationships can be approximated in an equation which is linear and in logarithmic form.

Logarithmic values of the variables were taken for 100 stocks for each year from 1960 through 1964 and the equation in the following form was tested:

\[
\ln \frac{P}{E} = a + b_1 \ln (1 + g) + b_2 \ln (PAY) + b_3 \ln (MKT) + b_4 \ln (CON) + b_5 \ln (VAR) + b_6 \ln (FIR).
\]

The regression results are given below:

- Variable explained more than 75% of variance in P/E ratio as measured by R².
- All hypotheses tested were accepted on the basis of “t” values.

The results were indicative of the following:

- High P/E: Rapid earning growth and higher dividend payment.
- Low P/E: Higher discount rates are associated with less marketability, greater conformity to market prices movements & lower price variability.
- Firm effects explain P/E ratios more than any other variable.
c) The authors (1970) extended the research by including risk variables suggested in the portfolio theory. The variability in rate of return, as measured by standard deviation, is split into systematic risk and firm specific risk. Cross-sectional estimates were made for the following:

\[
\frac{P}{E} = a + b_1 (VAR) + b_2 (PAY) + b_3 (adj\ E) + b_4 \sigma_{RR} + b_5 Mkt.
\]

Splitting \(\sigma_{RR}\) into \(b_1 \beta + b_2 \sigma_R\) and further into \(\sigma_{RR}\) with \(b_4 \alpha + b_5 \beta + b_6 \sigma_e\)

The results obtained were tested for consistency (of regression coefficients) over the years. Results showed that firm effects, taken as residuals, were steady for new firms and that for some industry groups.

d) A subsequent study by Malkiel and Cragg (1970) used expectational data and tested for consistency in results. Forecasts of long term growth rates of earnings for 178 corporations as of five year end periods from 1961 through 1965 were the data used for the study. Security Analysts' estimation of 'normal' earnings for the preceding year, for the following year and their expectations about future variability of earnings stream were collected from 17 investment firms. Historical financial data viz., growth rates on financial ratios, such as past dividend rates and payout ratios were also collected. The purpose was to ascertain whether estimates of future growth rates from investment firms would help obtain satisfactory explanation for the structure of share prices. Following factors were taken as risk proxies:
• variance of the future returns stream from each security.
• an index of conformance between the returns of each individual security and that of a market index.
• leverage for measuring the 'financial risk' of the company.

Highlights of Results of regression tests carried out are:

1) Regression Results Using Historical Values

\[ \text{P/E} = a_0 + a_1 g + a_2 \text{D/E} + a_3 \text{I}_{\text{it}} \]

- Above half of the variance in P/E was explained by regressions.
- Growth rate was highly significant in each of the years covered.
- Payout risk measures had their expected signs but were not significant.

2) P/E ratios on average growth Rates and other expectational variables:

\[ \text{P/E} = a_0 + a_1 \bar{g} + a_2 \frac{D}{NE} + a_3 \text{I}_p. \]

- All coefficients had their expected signs.
- Fits were very close for cross sectional empirical work and were much better than those obtained with historical data.
- About 3/4 of variability of P/E was explained by regression.

3) Regression Results Employing a Covariance Risk Measure:

\[ \text{P/E} = a_0 + a_1 g_H + a_2 \text{D/E} + a_3 \beta \]
• Regression coefficients had right signs in all cases except for 1961 regression employing expectational data.

• Values were significant in 2 out of 5 years, indicating general consistency in the results.

• Beta had strong influence on P/E

• Values associated with Beta were slightly higher than those associated with either of two previous risk variables.

4) Regression results employing a combination of expectational and historical data:

\[
\frac{P}{NE} = a_0 + a_1 \beta + a_2 E_{t+1}/NE + a_3 D/NE + a_4 F/(E + F) + a_5 \text{Dum} + a_6 I\text{H2}
\]

• Dummy variable took value of unity for utility companies & zero for industrials, to account for the differences in risk between two classes of companies not captured by other risk variables.

• Combined variables well explained structure of share prices.

• Coefficient of financial risk variables showed 'correct' sign and was significant in all but one year, providing support for the proposition that the required rate of return on equity should be an increasing function of leverage.

5) Regression on Expectation data alone:

\[
P/NE = a_0 + a_1 3_p + a_2 E_{t+1}/NE + a_3 D/NE + a_4 I_p
\]

• Longterm growth variables contribute most to an explanation with t value over 13 in every year.
- Coefficient of short term growth \( \frac{E_{t+1}}{NE} \) was positive and highly significant.
- Signs of coefficients of payout ratio and risk proxy were positive and negative respectively. They were as expected and were significant.

Following notations are used in the equations given above.

\[ \begin{align*}
\text{a)} & \quad G_h = \text{Historic 10 Years' Growth Rate of Cash Earnings.} \\
\text{b)} & \quad D/E = \text{Dividend Pay-Out Ratio (Averaged Were Seven Years)} \\
\text{c)} & \quad I_{H2} = \text{An Instability Index of Earnings (Calculated As Semi-Deviation of Earnings Over Past 10 Years.)} \\
\text{d)} & \quad F/E+F = \text{Leverage Variable - Ratio of Fixed Charges To Earnings + Fixed Charges.} \\
\text{e)} & \quad IH2 = \text{Calculated Instability Index of The Historic Operating Earnings Stream.} \\
\text{f)} & \quad NE = \text{Normalised Earnings.}
\end{align*} \]

Since this model is simple to apply, numerous studies have been found in literature with different combinations of P/E determinants at various time periods with differing conclusions. Main drawback of most of the tests was that the results obtained were neither statistically significant nor consistent over time, casting doubts about their usage for portfolio selection.

5) Keenan (1970)'s article focused mainly on the methodology used in testing the equity valuation models which were based on the assumption of linear relationship between prices and various financial (both return and risk) variables. The article
brought out the criteria to be used to evaluate the valuation models by forming testable parameters. They were:

a) Estimated parameters should be significant with consistent parameter signs and good explanatory power.

b) The estimated parameters should exhibit reasonable stability in different cross-section sample values as there are obvious market imperfections or anomalies that have not been incorporated in the model.

c) The parameters should exhibit reasonable stability over time.

The hypothesis tested were whether the parameters tested were significantly different from zero by taking into account both the parameter signs and the parameter magnitude. To illustrate the criteria, the author considered three valuation models - Benishay Model, Gordon Model and Investor Model - and compared the consistency in results. These models were tested using data from 1951-1959. Variables considered for equity valuation under these models were:

**Benishay Model:**

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in Earnings Factor</td>
<td>Net Income After Taxes</td>
</tr>
<tr>
<td>Growth in Equity Value</td>
<td></td>
</tr>
<tr>
<td>Pay-out Ratio</td>
<td></td>
</tr>
<tr>
<td>Stability of Income Measure</td>
<td>Market Value of shares</td>
</tr>
<tr>
<td>Stability of Equity Value Size</td>
<td></td>
</tr>
<tr>
<td>Debt - Equity Ratio</td>
<td></td>
</tr>
</tbody>
</table>
Gordon Model

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividend per Share</td>
<td></td>
</tr>
<tr>
<td>Dividend Growth Rate</td>
<td></td>
</tr>
<tr>
<td>Earnings Instability Index</td>
<td>Price per share</td>
</tr>
<tr>
<td>Leverage Index</td>
<td></td>
</tr>
<tr>
<td>Operating Asset Liquidity Index</td>
<td></td>
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<tr>
<td>Firm Size Index</td>
<td></td>
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</tbody>
</table>

Investor Model:

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividend</td>
<td>Price</td>
</tr>
<tr>
<td>Earnings Growth Rate</td>
<td></td>
</tr>
</tbody>
</table>

- The models were tested for each of four years from 1956-1959 for consistency. Results indicated that many of the independent parameters in the Benishay models were not significant. Exception to this was the variables that related to size measure and debt-equity measure. However, its significance was attributed to statistical bias (the denominator of the dependent variable and numerator of size variable are the same measure).

- Testing of Gordon model indicated that most of the parameters are significantly different from zero for the majority of the regressions with an exception of earnings instability index and operating asset liquidity index. In order to evaluate parameter stability, a series of covariance tests were performed. The results of these covariance tests indicated that assumptions about the equivalence of population parameters must be rejected whether one considers possible pooling cross-sectionally or inter-temporally.
• The Investor model was not in terms of financial variables but based on parameters directly observed by investors in the market. Under this model, price is assumed to be a function of expected dividends (measured as the greater of actual reported dividends or 40 cents per share) and capital gains (measured as the greater of an exponentially smoothed function of past gains or $2 per share). Regression results of this model indicated highly significant parameters.

The results reported were typical of what one finds in empirical studies of equity valuation models.

• There are a group of financial variables that have significant statistical parameters. They include earnings, dividends, retained earnings, growth measures, lagged prices, capital gains, size etc.. Smoothing the historical series of the variables will improve statistical significance.

• There is the other group of variables, mostly risk measures, where parameter significance or sign is often indeterminate.

• An examination of the regression residuals of the models shows that they violate the assumption of standard normal regression theory i.e., the sampling variances could not be considered constant. residuals were greater than 4 standard deviations from the mean; strong firm effects and moderately strong industry effects were noticed.

• Absence of a capture-all-firm effect-factor and the possibility that the basic return generating functions in financial markets have complex moments are given as reasons for the failure of the model.
2. THE WARREN BUFFETT WAY

This selection model used by Buffett, the most successful investor of this century, is a blend of both Decision and Selection Models discussed so far. Qualitative factors are also built into the model. The investment principles adopted for selecting and buying common stocks as grouped in the book by Hagstrom, Jr. (1994) are discussed below.

Business Tenets: Three characteristics considered are:

a) Understanding thoroughly the business operations in terms of revenues, expenses, cash flow, labour relations, pricing flexibility and capital allocation needs.

b) Selecting firms with consistent operating history that is characterised by resistance to severe changes.

c) Choosing companies with favourable long term prospects coupled with greater amount of economic goodwill.

Management Tenets: Quality of the management in which the money invested is tested through:

a) Rationality: The management's decision to allocate its earnings during different stages of its business life cycle. For instance, the management deciding to reinvest part of its earnings, instead of distributing to the shareholders, when its product life cycle is in maturity or declining stage (when the company's rate of earnings would be less than its cost of capital) would indicate irrational decision.
b) Candour: Disclosure of all necessary information required by shareholders to judge the economic performance - even beyond the scope of Generally Accepted Accounting Principles (GAAP).

**Financial Tenets:**

a) Return on Equity: ‘Managerial economic’ performance of firms is measured by the rate of return on the shareholders’ funds without undue leverage and window dressing of accounts. The operating earnings are adjusted for the following:

i. All marketable securities are valued at cost and not at market value in order to reduce the influence of rising/falling stock market values on operating results.

ii. Adjusting for unusual items such as capital gains or losses.

b) Owner Earnings: Due to differences in the capital outlay and capital structure, accounting earnings or the cash flow per share is not taken as the correct measure for comparing the performance of manufacturing companies. Instead of earnings, a measure known as ‘Owner earnings’ is used. ‘Owner earnings’ is defined as company’s net income plus depreciation, depletion and amortisation less the amount of capital expenditure and any additional working capital that might be needed to maintain its economic position and unit volume. Capital expenditure is subtracted on the ground that these expenses if not incurred for over a long period, the manufacturing unit will not be in a position to maintain its economic value thus leading to a decline in its business growth.
c) Profit Margins: Low cost operation is considered better than allowing costs to escalate and then cutting down costs.

d) One-dollar premise: This test is used to judge both the economic value of the business and the success of the management's goal of creating shareholder value. The increase in stock prices should at least match the increase in retained earnings, dollar for dollar. This is based on the premise that if a company has been able to achieve above average return on augmented equity, year after year, the same will be reflected in increased stock price.

**Market Tenets:** Based on the above principles, it is possible to select companies for inclusion in / exclusion from portfolio. The actual decision to buy / sell will be taken on the basis of:

a) Value of business: Determination of the intrinsic value on the basis of 'going concern' approach suggested by J.B. Williams i.e. the net cash flows expected to occur over the life of the business discounted at an appropriate interest rate. The discount rate used for the purpose of valuation is the risk-free rate of long-term government bond. However, this rate does not include any risk premium (for capturing the uncertainty of the future cash flows) for securities with low leverage and less variability in earning (past as well as projected.) are only selected.

b) Safety Margin: Stocks with high safety margin are selected. Safety margin is the difference between the market price and the intrinsic value beyond a certain fixed percentage.

In order to arrive at investment decision, multi-growth version (two phase) of Dividend Discount Model is considered. This DDM
assumes a high constant divided growth rate for a certain number of years initially and a lower constant growth rate thereafter. The value thus arrived at is compared with "owners' earnings" and the scrip is bought if sufficient safety margin is available.

3. Wells Fargo Stock Evaluation System

This system uses the concept of the value of a share being equal to the present value of future dividends and the concepts of modern capital market theory. The system analyses the stock as follows:

a. By finding the discount rate that equates the stock's future dividends with price, the rate of return implicit in the price is estimated.
b. For predicting future dividends, the system uses three-phase growth model. That is, forecast of dividends/earnings in the next five years, assumption regarding the pattern of growth expected between the 5th year and the steady growth phase and lastly description of long term behaviour of the firm with assumption on steady state pay out and growth rate.
c. Using historical data risk estimates, measured in terms of systematic risk (beta), are also made.
d. The expected return (based on discounted cash flow) and expected risk (in terms of beta) for each of the companies in the sample is plotted and the straight line that fits these points is used as an estimated security market line and used for stock selection/portfolio construction.

If the share offers a return above the return that should be warranted, given its risk, it is a good buy. If it has a lower return, the same can be sold.
The decision models presented above are useful for deciding the 'timing' of buying or selling stocks. The fair price or the average ratio arrived at by employing one or combination of models are compared with the actual price / ratio and share with sufficient safety margin is included in / excluded from the portfolio. It is possible to build a portfolio of stocks by applying these models on stocks from different industry / management groups. Evaluation of the performance of the portfolios so constructed over a time period is also possible as these models are essentially timing models. Moreover, as shown by some of the models, evaluating the risk associated with the portfolio is also possible if decision models are used.
SECTION C

LIMITATIONS OF MODELS BASED ON FUNDAMENTAL ANALYSIS

From the foregoing discussions, the salient features of investment models based on fundamental analysis may be summarised as follows:

1. Return from a security indicates a change in intrinsic value between the time of buying a security and selling the same. This return is generally defined to provide adequate current income, capital appreciation without eroding the investment base. In other words, investment goal is defined to mean preservation of capital and providing scope for the growth in income and/or capital.

2. The ability of the investor to tolerate the risk of loss of income or principal is termed as risk. Given the investment goals and future budget the risk is externally weighed and then built into fair value computation. For instance, fair value estimation depends on cash flow from the security, the estimated / projected growth in the cash flow and the discount rate. The discount rate that is considered in fair value computation is the surrogate used for expected rate of return that in turn is based on the risk associated with the scrip as perceived by the investors. In other words, the discount rate is nothing but the rate of return required by the investors in order to compensate the risks inherent in realising the principal as well as income.
from the investment. The risk premium or the discount rate comprises risk free rate, inflation rate and a rate for assuming company specific risk. Thus, both return and risk are dealt with implicitly in share valuation.

3. Another feature of fundamental analysis is its focus on income stability. Stability of income is achieved through diversification. Diversification across various industries, business groups, geographical locations etc., is considered while combining scrips into a portfolio in order to reduce risk. The extent of diversification is measured in term of number of scrips from different industries or groups in a particular industry/group as compared to total investment.

4. Under fundamental analysis stocks are identified and included in the portfolio by considering

   a) the factors, which had been instrumental in generating abnormal returns in the past through various Decision Models: and

   b) the fair value of the share, which is based on estimates about the future using Valuation Models, is compared to market price or yield.
However, stock selection through fundamental analysis has following drawbacks:

a) Fund allocation is based on the computed margin of safety. The higher safety margin, the more is the fund allocation in a particular security. The implied drawback of this method of allocating funds is that, in practice, two factors viz., floating stock available and impact cost will tie the hands of fund managers if the fund size is huge.

b) When the scrips combined into a portfolio, though care is taken to ensure safety of capital through diversification it is not always effective. The reason being that the scrips are put together subject to some constraints on fund allocation but the security with the highest safety margin always gets the maximum allocation.

c) The focus of fundamental analysis is on return maximisation rather than on risk-return optimisation. Fundamental analysis helps investors select mispriced securities but the portfolio made through such selection does not ensure risk return trade off.
d) Performance evaluation of the portfolios made by employing fundamental analysis also suffers from drawbacks. For instance, the portfolio thus made cannot be evaluated with reference to risk as the same is considered implicitly in the process of intrinsic value computation. The other drawback encountered in evaluation is that the composition of the market index used may not be similar in terms of diversification and fund allocation.